

REMARKS

The Office Action mailed June 8, 1998 has been carefully considered and the amendments above and following remarks are respectfully submitted in response to the Examiner's Rejection of Claims 1-20 and, in light of an informal telephone conversation between the Examiner and the Applicants patent attorney, Steven J. Rosen.

Claim Rejection - 35 USC §112

1. The Examiner's rejection of Claims 17-19 under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicants regard as the invention has been carefully studied. The Applicants have amended Claim 17, from which Claims 18-19 depend, to overcome this Rejection by inserting "said" before "third and fourth regions" in Claim 17, line 19, thus, eliminating any ambiguity in the Claims. The Applicants respectfully submit that this Amendment overcomes the Examiner's rejection of Claims 17-19 under 35 U.S.C. 112, second paragraph, and that these Claims as well as all other Claims in the present case are in condition for allowance.

Claim Rejection - 35 USC §103(a)

2. The Examiner's rejection of Claims 1-20 under 35 U.S.C. §103(a), as being unpatentable over Mannava 5,591,009, in view of Neal et al. 4,426,867, has been carefully considered by the Applicants and the Applicants respectfully disagree. The Applicants respectfully submit that the Mannava '009 patent is not available to the Examiner as a "103" reference because the Mannava '009 patent was filed (January 17, 1995) after an Invention Disclosure entitled "Enhanced Compressor Blade for Aircraft Engines" signed by the Applicants was disclosed to the Applicants' employer and based upon which the Parent Application, Serial No: 08/399,285, of the present Patent Application was filed (March 6, 1995). A new "DECLARATION UNDER 37 C.F.R. 1.131(b)" signed by the Applicants is submitted herewith supporting this position. The Declaration

states that the Applicants invented the present invention prior to the effective or filing date of the Mannava '009 patent. The Declaration states that the Applicants conceived the present invention prior to the effective or filing date of the Mannava '009 patent and was diligent in reducing it to practice up until the filing date of the present invention. Therefore, the Applicants respectfully submit that the Examiner's rejection of Claims 1-20 under 35 U.S.C. §103(a), as being unpatentable over Mannava, in view of Neal, has been overcome by the remarks above and the attached 1.131(b) Declaration and should be withdrawn.

The depth limitation of the compressive residual stresses of the present invention more clearly defines and points out the nature of the compressive residual stresses imparted by the laser shock peening process and points out that they are deep stresses and far stronger forces are used than taught by Neal. Neal warns against strong forces fearing damage to the blade edges caused by severe impact of shot on the surface to be peened (column 1, lines 33-65) thus, teaching away from the present invention. Laser shock peening is an explosive process as understood in the art and as used herein and the prior art has not shown laser shock peening to be interchangeable with or the equivalent of shot peening. Laser shock peening uses a laser beam to produce a strong localized compressive force on a portion of a surface. The laser beam is fired through a curtain of flowing water that is flowed over a painted surface and the paint is ablated generating plasma which results in shock waves on the surface of the material. These shock waves produce forces that act normal to the surface of edges of the airfoil and, therefore, directly away from the teaching of Neal which desires the impact of the shot, due to gravity shot peening, to be at a maximum oblique angle to the tangent of the edge surface which is designed to lessen the peening force to avoid deformation. Neal clearly teaches directly away from both the '009 patent reference and the teaching of the present invention. Neal clearly teaches and warns away from using a direct force

normal to the surface being peened as is done in the present invention and the '009 patent.

The Examiner stated that it would have been obvious to a person of ordinary skill in the art to utilize the repaired laser shock peened gas turbine engine component in Mannava '009 for the compressor blades as taught by Neal. The argument above clearly shows this is not the case. The Examiner fails to take into account that Neal expressly states that normal shot peening damages the leading edge surface and that Neal teaches to lessen the blow by directing the shot at an oblique angle to a tangent of the surface. This teaching of Neal, when taken with the rest of the whole of the prior art, clearly teaches one not to use the teaching in the Mannava reference to peen an edge of a compressor airfoil.

Furthermore, because of the angling of the blade in Neal to avoid a normal hit on the surface, it would be impossible to have simultaneously peened pressure and suction sides of the edges of the blade as is claimed in Claims 3, 5, 8, 9, 13, 14, 18 and 19.

Therefore, the Applicants respectfully submit that it would not have been further obvious at the time the invention was made to a person having ordinary skill in the art to apply the laser shock peening as taught in the Mannava 5,591,009 patent to the blade of Neal.

The Applicants respectfully submit that the Examiner's combination of prior art and subsequent rejection have been overcome by the amendments and remarks above and that the present Claims are patentable over the combination of cited references because of the differences between the prior art and the Claims at issue. The prior art itself not only fails to teach a particular combination which results in the claimed invention, but in fact, teaches away from and warns against the present invention and is inconsistent with the purposes of the present invention.

Furthermore, the Applicants respectfully suggest the Examiner broke the invention into its constituent elements, found each element of the invention in the prior art, and then

claimed it would have been obvious for one of ordinary skill in the art to reassemble those elements into the invention; all of which constitutes the forbidden hindsight reconstruction in analyzing obviousness as discussed in previous amendments.

Therefore, the Applicants respectfully submit that the Examiner's rejection of amended Claims 1-20 under 35 U.S.C. 103(a), has been overcome by the amendments and remarks, because of the absence of features of the presently claimed invention, because there has been nothing, not even a suggestion, shown in the prior art as to why the references should be combined as done by the Examiner and because it appears that the Neal reference teaches away from both the present invention and the Mannava '009 reference.

Double Patenting

3. The Applicants have now studied the Examiner's obvious type Double Patenting rejections of Claims 1-20 under the judicially created doctrine of double patenting. Claims 1-8, 11-13, and 16-18 stand rejected, under the judicially created doctrine of double patenting, over Claims 1, 1, 3, 1, 3, 1, 1, 3, 1, 1, 3, 1, 1, and 3, respectively, of U.S. Patent No. 5,591,009 in view of Neal. Claims 9-10, 14-15, and 19-20 stand rejected, under the judicially created doctrine of double patenting, over Claims 4, 4, 4, 4, 4, and 4, respectively, of U.S. Patent No. 5,591,009 in view of Neal.

The Applicants respectfully disagree with the Examiner for the reasons stated below. The Examiner states that Claims 1 and 9 of Mannava '009 claim substantially the same subject matter as the present Application except for the gas turbine component being a compressor blade. This is not exactly correct because the Claims in '009 all specifically claim a fan blade which is substantially different than a compressor blade. Fan blades are far bigger and thicker than compressor blades. A well known concern for the thinness of compressor blades is expressed in Neal (col. 1, lines 44-57). The Examiner states that Neal teaches compressor may be peened but

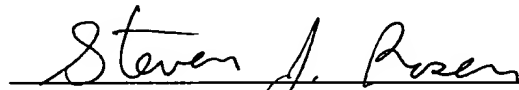
that is not fully correct and is taken out of context. Neal teaches they can be peened at oblique angles avoiding normal hits along the edge and warns against normal hits along the edge.

Each of Claims 1-20 also stand rejected, under the judicially created doctrine of double patenting, over Claim 1 of U.S. Patent No. 5,531,570. The Applicants will file a timely terminal disclaimer with regards to U.S. Patent No. 5,531,570 when the remaining prosecution on the merits is completed.

The Applicants respectfully submit that the Examiner's obvious type Double Patenting rejection of Claims 1-20 with regards to U.S. Patent No. 5,591,009 have been overcome by the remarks above.

4. The Applicants respectfully submit that Claims 1-20 are now in condition for allowance based on the amendments and remarks above.

Respectfully submitted,



Steven J. Rosen
Attorney for the Applicants
Reg. No. 29,972

July 28, 1998

General Electric Company
1 Neumann Way - MD H17
Cincinnati, OH 45215-6301

Phone: (513) 243-8925
Alt: (513) 489-5383
FAX: (513) 489-5466